RESIDENTIAL WOOD SMOKE $PM_{2.5}$ AND A BIOMARKER OF OXIDATIVE STRESS IN ASTHMATIC CHILDREN

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Background and Aims: Exhaled breath condensate (EBC) is a biofluid that can be analyzed for biomarkers of respiratory stress. Our randomized trial targets in-home interventions to improve air and quality of life among asthmatic children. Results presented here compare baseline measures of indoor fine particulate matter ($PM_{2.5}$) and EBC biomarkers in these children, as well as results from a clinically recognized Pediatric Asthma Quality of Life Questionnaire (PAQLQ).
Methods: Indoor $PM_{2.5}$ was recorded in 28 woodstove homes over a 48-hour period (DustTrak; TSI). EBC samples were collected using Rtubes (Respiratory Research) and were analyzed for 8-isoprostane, a marker of oxidative stress. Regression analyses were performed to establish the relationships between $PM_{2.5}$ exposure, levels of 8-isoprostane in EBC, and PAQLQ score.
Results: The mean (sd) indoor $PM_{2.5}$ concentration was 48.6 (41.1) $\mu g/m^3$. Mean 8-isoprostane concentrations in EBC were 2.42 (± 4.0) pg/mL. Subjects with 8-isoprostane concentrations above the median had a 0.75 (-1.63, 0.14) point lower mean overall PAQLQ score, relative to those with below-median concentrations, though this relationship was not statistically significant. Subjects with above-median 8-isoprostane tended to have lower PAQLQ sub-scale scores with the strongest effects observed for the activity domain (-0.93, 95% CI: -1.9, 0.07). Observed indoor $PM_{2.5}$ effects on PAQLQ were most pronounced, though still modest, in those with above-median 8-isoprostane in EBC (10 $\mu g/m^3$ increase in $PM_{2.5}$ associated with 0.1 decrease in mean score, 95% CI -0.2, 0.02).
Conclusions: Presented here are baseline observations for approximately 30% of the ultimate cohort. We observed an inverse relationship between 8-isoprostane and PAQLQ scores. Our data suggest that subjects with higher EBC concentrations of oxidative stress markers may be more susceptible to $PM_{2.5}$ exposure effects on PAQLQ. Continued tracking of these and other biomarkers will enable us to evaluate the causal and temporal natures of these relationships.

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